

## PATENT ABSTRACTS OF JAPAN

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(21)Application number : 2001-140856

(71)Applicant : HITACHI LTD

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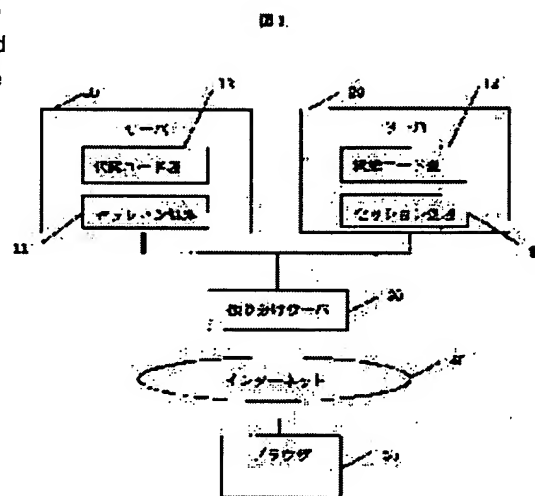
(72)Inventor : UMEDA TAICHI  
HASEGAWA HIROYUKI

## (54) METHOD FOR CARRYING ON SESSION AT LOAD DECENTRALIZATION TIME

## (57)Abstract:

**PROBLEM TO BE SOLVED:** To solve the problem that when a process is assigned to a server different from the last one, information begins to be transferred between the servers to restore the state of a session and then decrease in performance and the generation of a network load are caused.

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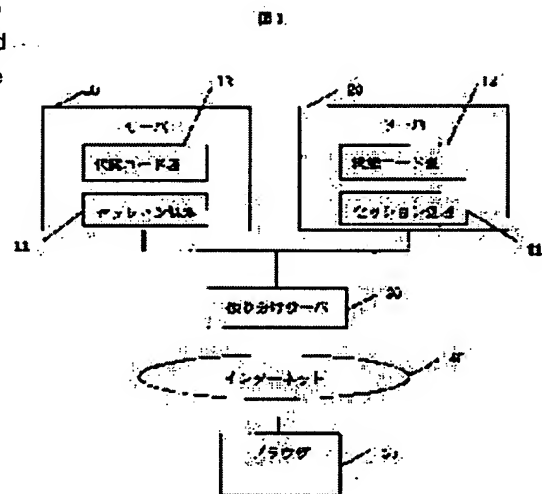
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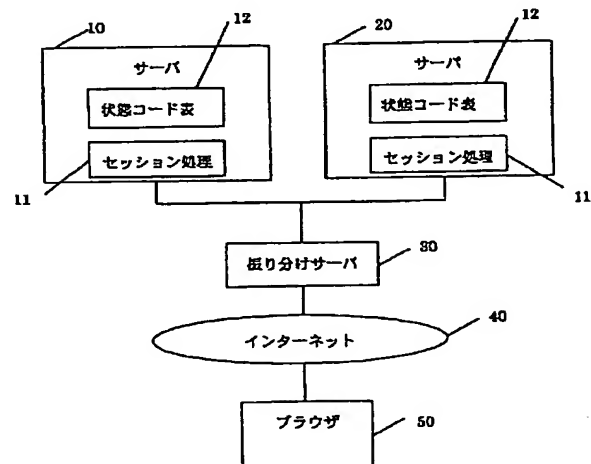
(54) 【発明の名称】 負荷分散時のセッション継続方法

(57) 【要約】

【課題】 前回と異なるサーバへ処理が割り当てられると、セッションの状態の回復のためにサーバ間で情報の転送が起こり、性能低下、ネットワーク負荷が発生する。

【解決手段】 それぞれのサーバにあらかじめ状態コードと状態の対応表を保持しておき、クライアントへの応答時にクッキーに現在の状態を表す状態コードを含めて返し、リクエストとしてそのクッキーを受け取ったサーバは、状態コードから状態を回復する。

図1



## 【特許請求の範囲】

【請求項1】セッション管理を必要とする処理を行う複数台のサーバと負荷分散を行う振り分けサーバより成るシステムにおいて、各サーバにセッションの状態と状態コードの対応を表す状態コード表を設け、状態コードの入ったクッキーと状態コード表を用いてセッションの状態を回復することを特徴とする負荷分散時のセッション継続方法。

## 【発明の詳細な説明】

## 【0001】

【発明の属する技術分野】本発明は、インターネットにおけるサーバの負荷分散時のセッション継続方法に関する。

## 【0002】

【従来の技術】従来は、特開2000-163369号公報に記載のように、インターネットでセッション管理を必要とする処理を行うサーバの負荷分散を行う場合、そのセッションの処理状況の情報(状態)をサーバ側で分散管理しているため、前回と異なるサーバへ割り当てられると、そのセッションの状態を保持するサーバから、新しい割り当て先のサーバへ引き渡し、セッションの状態の回復を行う必要があった。

## 【0003】

【発明が解決しようとする課題】上記従来技術によるセッション情報の分散管理は、振り分けサーバにより前回と異なるサーバへ処理が割り当てられた場合にネットワークの負荷を低減することについては開示されていない。

【0004】本発明は、振り分けサーバにより前回と異なるサーバへ処理が割り当てられた際のサーバ間の無駄な情報転送をなくすことを目的とする。

## 【0005】

【課題を解決するための手段】上記の目的は、それぞれのサーバにあらかじめセッションの状態と状態コードの対応を表す状態コード表を保持しておき、クライアントへのレスポンス時のヘッダーにクッキーとして現在のセッションの状態を表す状態コードを含めて返し、リクエストとしてそのクッキーを受け取ったサーバは、クッキーから状態コードを取り出し、状態コード表からその状態コードに対応するセッションの状態を検索し、検索結果の状態を現在のセッションの状態としてサーバに設定することによって達成される。

## 【0006】

【発明の実施の形態】以下、図面を参照して本発明の実施例を説明する。

【0007】図1は本実施例のシステム構成図である。

【0008】本実施例は、インターネット40に接続されたブラウザ50、負荷分散を目的に設置される振り分けサーバ30、及び振り分けサーバに接続される同機能を持つサーバ10、20によって構成される。各サーバ10、20には

状態と状態コードの対応を現す状態コード表12を設定する。また、各サーバ10、20には、設定された状態コード表12と現在のセッションの状態から、状態コードを現すクッキーを生成しブラウザ50へのレスポンスヘッダへ含めたり、ブラウザ50からのリクエストヘッダに含まれているクッキーから状態コードを取り出し、その状態コードと状態コード表12から状態を取得し、それを現在のセッションの状態として設定するためのセッション処理11の機能が実装される。

10 【0009】図2は本発明を適用したシステムの画面遷移の一例であり、図3は図2の例においてシステム側で必要となるセッションの情報を項目別に整理したものである。このシステムの実行環境であるサーバへの要求は振り分けサーバ30により負荷分散され、図2中の矢印で示される遷移は前とは異なるサーバに割り当てられる可能性がある。このシステムは旅行の予約システムであり、中には旅行先の選択110、宿泊先の選択120、代金支払方法の選択130などの選択肢があり、これらの選択はセッションの引き継ぎに必要となる情報である。まず、  
20 利用者はログイン画面100からログインし、旅行先指定画面110へ遷移する。この画面で利用者は旅行先を決定する。以降のセッションでサーバに必要な情報は旅行先201であり、値として旅Aや旅Bなど211のいずれかが選択可能である。次に宿泊先の検索画面120へと遷移する。ここでは希望する条件を選択し、絞り込みの検索を行う。この絞り込み検索はその都度検索結果を利用者に返す必要があるため、検索条件もセッションの情報としてサーバに引き継がれる必要がある。必要となるセッションの情報は検索条件202であり、値としてホテルか  
30 民宿かどうか、1万円以内か2万円以内かどうかなど212が選択可能である。宿泊先が決定されるとセッションの情報として宿泊先203が必要である。また、同様にして代金支払方法指定画面130では代金支払方法204がセッションの情報としてサーバに必要なとなる。

【0010】図4は、図3にまとめたセッションの継続に必要な情報を元にサーバの持つ状態と状態コードを対応付けた状態コード表である。例えば旅行先指定画面110で旅Aを選択し、宿泊先の検索画面120で条件がホテルでかつ1万円以内を選択411している状態410に対して状態コード400としてX401を定義している。この状態コード表は、ブラウザ50に渡すクッキーを生成する際には状態410から状態コード400へと、ブラウザ50から受け取ったクッキーから状態を回復する際には状態コード400から状態410へと、双方向に利用される。例えば、状態コード400、X401を受け取ったサーバは、旅行先として旅Aを、宿泊先の検索条件としてホテルでかつ1万円以内という状態を現在の状態に設定し、宿泊先の検索の続きを行うことができる。

【0011】図5は本実施例の動作を表すフローチャートである。ブラウザ50からサーバに対してリクエストが

あると、振り分けサーバ30によりサーバへのリクエストの割り当て処理が行われる(ステップ500)。ここでリクエストはブラウザ50からの初めてのリクエスト(すなわち状態コードを表すクッキーを持っていない)であり、振り分けサーバ30によりサーバ10に割り当てられたとする。サーバ10ではセッション処理11により、クッキーのチェックを行い、このリクエストが初めてのリクエストかどうかを判断する(ステップ510)。初めてのリクエストであるためこの結果はYESであり、状態を回復させる処理は必要ないので何もしない。次にサーバ10によりセ

ッション管理を必要とするような処理が行われ、状態の変更が行われる(ステップ530)。最後に、あらかじめ保持している状態コード表12より、現在の状態の状態コードをクッキーに入れてレスポンスとしてブラウザ50に返す。

【0012】新たに同じブラウザ50からサーバに対してリクエストがあると、上記同様、振り分けサーバ30によりサーバへのリクエストの割り当て処理が行われる(ステップ500)。ここでリクエストは振り分けサーバ30によりサーバ20に割り当てられたとする。サーバ20ではセ

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理が行われ、状態の変更が行われる(ステップ530)。最後に、あらかじめ保持している状態コードと状態の対応表より、現在の状態の状態コードをクッキーに入れてレスポンスとしてブラウザ50に返す。

【0013】

【発明の効果】以上説明したように、本発明によれば、セッション情報の分散管理環境において、振り分けサーバにより前回と異なるサーバに処理が割り当てられても、クッキーから状態を回復することができるので、サーバ間で行われていた情報の転送なしにセッションを継続することができるという効果を奏する。

【図面の簡単な説明】

【図1】本発明の実施の形態を示すシステム構成図である。

【図2】本発明の適用例の画面遷移である。

【図3】本発明の適用例でサーバに必要なセッションの情報である。

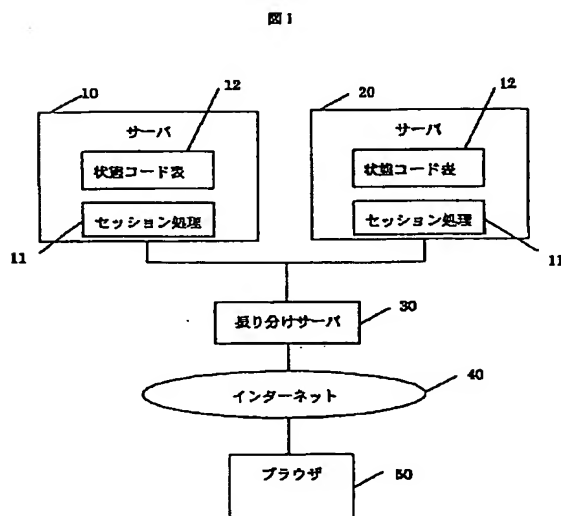
【図4】本発明の適用例の状態コード表の構成である。

【図5】本発明の実施の形態の動作を示すフローチャートである。

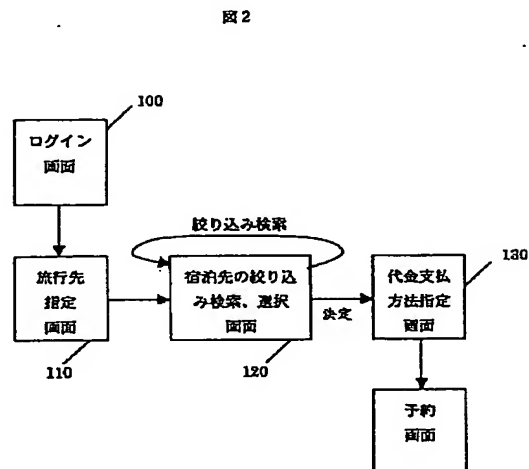
【符号の説明】

- 10 サーバ
- 20 サーバ
- 11 セッション処理部
- 12 状態コード表
- 30 振り分けサーバ

【図1】



【図2】



【図3】

図3

201	設定項目	値	211
202	旅行先	旅A、旅B、・・・、未設定	212
203	検索条件	ホテル、民宿、・・・、未設定(どちらでもよい) 1泊1万円未満、2万円以内、・・・、未設定 ・・・ 駐車場あり、なし、・・・、未設定	
204	宿泊先	宿A、宿B、・・・、未設定	
	支払方法	クレジット、銀行振込、・・・、未設定	

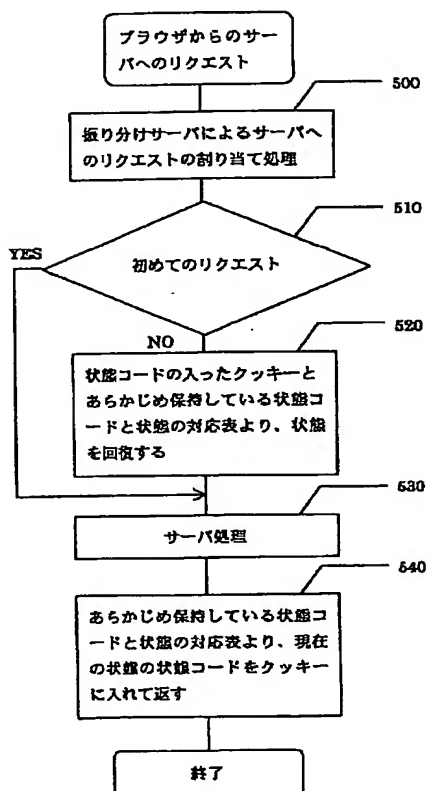
【図4】

図4

	400	410	
	状態コード	状態	
401	X	旅A、ホテル、1万円以内	411
402	Y	旅A、宿A、支払方法未設定	412
	Z	旅A、宿A、クレジット	
	W	・・・	
	.	・・・	

【図5】

図5



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Bibliography

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- (43) [Date of Publication] November 22, Heisei 14 (2002. 11.22)
- (54) [Title of the Invention] The session continuation approach at the time of a load distribution
- (51) [The 7th edition of International Patent Classification]

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13/00 353

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  - [Patent Attorney]
  - [Name] Sakuta Yasuo
  - [Theme code (reference)]

5B085  
5B089

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Epitome

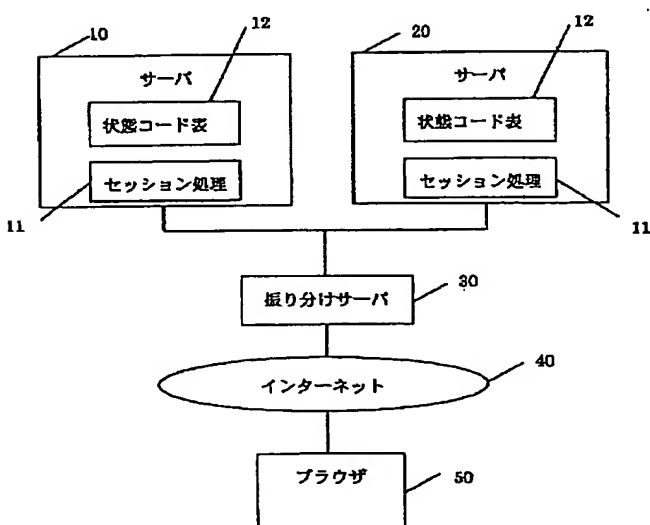
(57) [Abstract]

[Technical problem] If processing is assigned to a different server from last time, an informational transfer will take place between servers for recovery of the condition of a session, and degradation and a network load will be generated.

[Means for Solution] The server which holds the conversion table of a condition code and a condition beforehand to each server, returned including the condition code which expresses a current condition to Cookie at the time of the response to a client, and received the Cookie as a request recovers a condition from a condition code.

[Translation done.]

図 1



[Translation done.]

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## CLAIMS

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[Claim(s)]

[Claim 1] The session continuation approach at the time of the load distribution characterized by recovering the condition of a session using the Cookie and the condition-code table into which the condition-code table which expresses the condition of a session and correspondence of a condition code to each server was established in the system which consists of two or more sets of the servers which perform processing which needs session management, and the distribution server which performs a load distribution, and the condition code went.

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[Translation done.]

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## DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the session continuation approach at the time of the load distribution of the server in the Internet.

[0002]

[Description of the Prior Art] Conventionally, when the load distribution of the server which performs processing which needs session management by the Internet like a publication was performed to JP,2000-163369,A and it was assigned to a different server from last time since distributed management of the information on the processing situation of the session (condition) was carried out by the server side, from the server holding the condition of the session, it needed to hand over to the server of a new assignment place, and the condition of a session needed to be recovered.

[0003]

[Problem(s) to be Solved by the Invention] Distributed management of the session information by the above-mentioned conventional technique is not indicated about reducing a network load, when processing is assigned to the server which differs from last time by the distribution server.

[0004] This invention aims at losing the useless information transfer between the servers at the time of processing being assigned to the server which differs from last time by the distribution server.

[0005]

[Means for Solving the Problem] The above-mentioned purpose holds the condition-code table which expresses the condition of a session, and correspondence of a condition code to each server beforehand. The server which returned including the condition code which expresses the condition of a current session with the header at the time of the response to a client as Cookie, and received the Cookie as a request A condition code is taken out from Cookie, the condition of the session corresponding to the condition code is searched from a condition-code table, and it is attained by setting the condition of a retrieval result as a server as a condition of a current session.

[0006]

[Embodiment of the Invention] Hereafter, the example of this invention is explained with reference to a drawing.

[0007] Drawing 1 is the system configuration Fig. of this example.

[0008] This example is constituted by the browser 50 connected to the Internet 40, the distribution server 30 installed for the purpose of a load distribution, and the servers 10 and 20 with this function connected to a distribution server. The condition-code table 12 showing correspondence of a condition and a condition code is

set to each servers 10 and 20. Moreover, the Cookie showing a condition code is generated from the condition of the set-up condition-code table 12 and a current session, it includes in the response header to a browser 50, or a condition code is taken out from the Cookie contained in the request header from the browser 50 to each servers 10 and 20, a condition is acquired from the condition code and condition-code table 12 to them, and the function of the session processing 11 for setting it up as a condition of a current session is mounted in them.

[0009] Drawing 2 is an example of screen transition of the system which applied this invention, and drawing 3 arranges the information on the session which is needed by the system side in the example of drawing 2 according to an item. The load distribution of the demand to the server which is the execution environment of this system may be carried out by the distribution server 30, and the transition shown by the arrow head in drawing 2 may be assigned to a different server from a front. This system is a reservation system of a travel, there is alternative, such as the selection 110 of a travel place, the selection 120 of lodging, and the selection 130 of a price method of payment, in inside, and these selections are information which is needed for taking over of a session. First, a user logs in from the log in screen 100, and changes to the travel place appointed screen 110. A user determines a travel place on this screen. The information which is needed for a server in subsequent sessions is the travel place 201, and is selectable as a value. [ of either of 211, such as Trip A and Trip B, ] Next, it changes to the retrieval screen 120 of lodging. Here, the conditions for which it wishes are chosen and narrowing down is searched. Since this narrowing-down retrieval needs to return a retrieval result to a user each time, retrieval conditions also need to be taken over to a server as information on a session. the information on a needed session — the retrieval conditions 202 — it is — as a value — a hotel or a tourist home \*\*\*\*\* — less than 10,000 yen and less than 20,000 yen \*\*\*\*\* — etc. — 212 is selectable. If lodging is determined, lodging 203 is required as information on a session. Moreover, the price method of payment 204 is needed on the price method-of-payment appointed screen 130 for a server as information on a session similarly.

[0010] Drawing 4 is the condition-code table which matched the condition of having and condition code of a server, based on the information which is needed for continuation of the session summarized to drawing 3. For example, Trip A was chosen on the travel place appointed screen 110, conditions are hotels on the retrieval screen 120 of lodging, and X401 is defined as a condition code 400 to the condition 410 of carrying out less than 10,000 yen selection 411. In case this condition-code table recovers a condition from the Cookie received from the browser 50 from the condition 410 to the condition code 400 when generating the Cookie passed to a browser 50, it is bidirectionally used for a condition 410 from a condition code 400. For example, a condition code 400 and the server which received X401 can set the condition of being a hotel as retrieval conditions for lodging, and saying as a travel place Trip A being less than 10,000 yen as the present condition, and can continue retrieval of lodging.

[0011] Drawing 5 is a flow chart showing actuation of this example. If there is a request from a browser 50 to a server, quota processing of the request to a server will be performed by the distribution server 30 (step 500). A request is first request (that is, it does not have the Cookie showing a condition code) from a browser 50, and presupposes that it was assigned to the server 10 by the distribution server 30 here. In a server 10, by the session processing 11, Cookie is checked and this request judges whether it is the first request (step 510). Since it is the first request, this result is YES, and since it is unnecessary, no processings which recover a condition are carried out. Next, processing which needs session management by the server 10 is performed, and a change of a condition is made (step 530). More nearly finally than the condition-code table 12 currently held beforehand, the condition code of a current condition is put into Cookie, and it returns to a browser 50 as a response.

[0012] If there is newly a request from the same browser 50 to a server, quota processing of the request to a server will be performed by the distribution server 30 like the above (step 500). A request presupposes that it was assigned to the server 20 by the distribution server 30 here. In a server 20, by the session processing 11, Cookie is checked and this request judges whether it is the first request (step 510). Since it is not the first request, this result is NO and recovery of a current condition is performed from the condition code set as Cookie, and the condition-code table 12 which the server 20 has held beforehand (step 520). Next, processing which needs session management by the server 20 is performed, and a change of a condition is made (step 530). More nearly finally than the conversion table of the condition code currently held beforehand and a condition, the condition code of a current condition is put into Cookie, and it returns to a browser 50 as a response.

[0013]

[Effect of the Invention] Since a condition is recoverable from Cookie according to this invention even if processing is assigned to the server which differs from last time by the distribution server in the Distributed Management Environment of session information as explained above, the effectiveness that a session is continuable without a transfer of the information currently performed between servers is done so.

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DESCRIPTION OF DRAWINGS

Brief Description of the Drawings]

Drawing 1] It is the system configuration Fig. showing the gestalt of operation of this invention.

Drawing 2] It is screen transition of the example of application of this invention.

Drawing 3] It is the information on the session which is needed for a server in the example of application of this invention.

Drawing 4] It is the configuration of the condition-code table of the example of application of this invention.

Drawing 5] It is the flow chart which shows actuation of the gestalt of operation of this invention.

Description of Notations]

10 Server

20 Server

11 Session processing section.

12 Condition-code table.

30 Distribution server.

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DRAWINGS

[Drawing 1]